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# Early Fall Coyote Foods in Campbell and Bath Counties, Virginia

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## ABSTRACT

The diet of coyotes (*Canis latrans*) was studied on two sites in Virginia from September to October 2002. Plant material, particularly persimmon (*Diospyros virginiana*), was found in the majority of scats examined, which supports the model of coyotes as opportunistic omnivores. Given the adaptive nature of coyotes, longer-term studies are needed to fully understand their impact on the biota as their range expansion continues.

*Key words*: *Canis latrans,* coyote, scat analysis, Virginia.

## INTRODUCTION

Many researchers have investigated coyote (*Canis latrans*) diet (e.g., Fichter et al., 1955; Bowyer et al., 1983; Rose & Polis, 1998). It is clear from the results of these studies that coyotes are opportunistic omnivores that consume a large variety of foods and that their diets vary at several scales, including seasonally (Bowyer et al., 1983; Andelt et al., 1987), spatially (Rose & Polis, 1998), and individually (Fichter et al., 1955). Because of this variability, it is often impossible to predict what the diet of coyotes will be in any given area with any more precision than to say that it will probably consist of a variety of small to medium-sized mammals, supplemented by birds, insects, and vegetation.

The adaptability of coyotes continues to fascinate researchers and frustrate landowners. In the western United States, people have largely learned to coexist with coyotes (although not always peacefully). In the East, however, coyotes are a relatively new phenomenon and many people are unsure how to deal with them. As they continue their range expansion, there will be a growing need for sound information on their ecology so that effective management decisions can be made. Coyotes may compete for resources and directly affect populations of prey species or indirectly affect plant species through seed dispersal.

It is important to assess the role of coyotes as they enter new habitats (Toweill & Anthony, 1988). Chamberlain et al. (2000) noted that most studies of coyote diet have been conducted in the western and northern parts of their range. Given the adaptability of these animals, data from these studies are probably of limited value to understanding the ecology of coyotes in the East. The purpose of this investigation was to determine the major food items in the diet of coyotes in one area of the eastern part of their range during the early fall. A secondary objective was to document if coyotes were preying on cattle, which are raised in the study area. Since coyotes are known to prey on other domestic livestock, such as sheep (Shivik et al., 1996; Sacks et al., 1999), there is the possibility that coyotes may prey on cattle as well.

## METHODS

I collected and analyzed the composition of 17 coyote scats from two study sites during September and October of 2002. The majority of scats (n=14) were collected from a 60.7 ha farm in Campbell County, Virginia that is used primarily for grazing cattle. It consists of four fields, averaging 8.1 ha each, which are maintained for grazing and haying and are predominantly characterized by fescue and orchard grass. Juxtaposed with the fields is a matrix of forest of

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varying stand types and ages, including 10-15-year-old planted pines and 60-70-year-old mixed hardwoods. A first order stream, originating on the property, bisects much of the land. The farm has gently rolling hills without any steep slopes and a maximum elevation of 275 m. It is surrounded by properties with similar characteristics.

For comparison, three samples were collected from a site on Back Creek Mountain, located in the George Washington National Forest in Bath County, Virginia. This area is mostly 60-70-year-old mixed hardwood forest, although a few small 10-year-old clearcuts are present. There are no lotic water sources on the mountain, but there are a few water holes that have been created by the Forest Service. The terrain is generally steep with a maximum elevation of about 732 m (2400 ft).

Coyote feces were distinguished from sympatric canids (foxes, wild dogs) by shape, smell, size (Murie, 1974), and the presence of nearby tracks. If the identity of a scat was questionable, it was not collected. Each scat collected was placed in a plastic bag labeled with the date and location. Samples were placed on ice during transport and then frozen until analyzed.

Scats were thawed, then autoclaved for 15 minutes to destroy any endoparasites or tapeworm eggs that may have survived freezing (Litavaitis et al., 1996). Dissolvable material was separated from the major food items by placing the scats on a 1/16-inch mesh screen and washing with running water. Food items were then manually separated and identified. Mammals were identified by bones and hair, plants by seeds, and arthropods by exoskeleton fragments. Several guides were consulted to assist in species identification (Brown, 1952; Mayer, 1952 for mammals; Harlow, 1946 for plants; Borror & White, 1970 for arthropods). However, identification below the level of major taxonomic groups proved difficult. Much of the fecal contents was unidentifiable, which is not an unusual occurrence in these types of investigations (Putman, 1984). Food items were recorded by frequency of occurrence (number of scats with item /total number of scats).

## RESULTS

The majority of scats (53%) contained both plant and animal material. Twenty-nine percent contained only animal material and 18% contained only plant material. Because of the small sample size, a statistical analysis could not be used to test for differences between scats collected in the forested site and the farm site. Therefore, all scats were combined for this analysis.

Plant, arthropod, and mammal remains were recovered from the scats. Five species of plants (only persimmon was positively identified), one arthropod species (grasshopper), and at least one mammalian species were found. It is likely that more than 7 species were consumed (i.e., probably several mammalian species were consumed), but because of the difficulties encountered with identifying both plant and animal remains, a more thorough account of the scat contents could not be made. Plants occurred in 71% of the scats (with persimmon occurring in all scats with plant material), arthropods (grasshoppers) in 18%, and mammals in 76%. The four species of unidentifiable plants (known to be different species by the different seeds) combined to occur in 29% of the scats.

## DISCUSSION

As expected, mammals occurred in a significant number of scats (76%) in my sample. This is similar to the results of other studies. Andelt et al. (1987) found that mammals made up to 64% of coyote diet during early fall, and others (Fitcher et al., 1955; Bowyer et al., 1983; Rose & Polis, 1998) found that mammals make up the most significant portion of coyote diet, although this is highly variable throughout the year. The significance that plants, particularly persimmon (*Diospyros virginiana*), played in the diet of coyotes was unexpected. Most studies have found that although plants may occasionally play a significant role in coyote diet, especially during late spring and early fall or when prey availability is low, nothing in the literature suggests that plants occur in excess of 71% of scats, as was found in my study. Furthermore, although no formal measure of food item proportions within individual scats was made, most of the scats containing plant material were significantly plant-based. That is, they may have contained animal material in addition to the plant material, but the bulk of the scats consisted of plant material.

The frequency of persimmon occurring in the scats was surprising. Litvaitis & Shaw (1980) found persimmon seeds in 46% of coyote scats in the fall and Cypher & Cypher (1999) reported that coyotes were significant dispersers of persimmon seeds. It is possible, especially at the Campbell County site, that the recovered scats only represent one or two individuals who rely on persimmon to a greater extent than most of the population. However, many of the scats collected from the farm in Campbell County were almost exclusively comprised of persimmon seeds and even two of the three scats collected at the forested site contained persimmon seeds. This suggests that persimmons may play a more significant role in the fall

diet of eastern coyotes than in their western counterparts.

Longer-term studies of coyote diets are needed to fully determine the range of species consumed and the possible effects that coyotes may be having in the eastern United States as their range expands. The results of my study suggest that during the early fall, coyotes rely extensively on plant matter. Seasonal variation of coyote diet has been demonstrated in many studies, and although the current investigation only covered a limited time frame, the results seem to corroborate the definition of coyotes as opportunists, whether they are in the West or the East. As opportunists, coyotes present special challenges to researchers in determining the long-term effects of their presence in the eastern United States.

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